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Karen Michele Hochman Date: 12/3/2010

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MENTAL HEALTH SERVICE UTILIZATION PATTERNS IN PATIENTS ADMITTED TO THE FOCUS INTENSIVE OUTPATIENT TREATMENT PROGRAM AT GRADY HEALTH SYSTEM

BY

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Degree to be awarded: M.P.H.
Career MPH

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Abstract

MENTAL HEALTH SERVICE UTILIZATION PATTERNS IN PATIENTS ADMITTED TO THE FOCUS INTENSIVE OUTPATIENT TREATMENT PROGRAM AT GRADY HEALTH SYSTEM

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Karen Michele Hochman

Objective: This study examines mental health service use in a cohort of severely mentally ill patients admitted to an acute partial hospitalization program ("FOCUS") between November, 2004 and December, 2007. Service use in the twelve months before and after admission was examined. Service use data were then compared for program completers and non-completers.
Methods: The FOCUS intervention was designed for adults aged 18-64 who are suffering from one or more Axis I disorders accompanied by severe impairment. Treatment included: psychiatric assessment, nursing/medical screening, pharmacotherapy, group, family and individual therapies, and case management. Programming was for five hours/day, five days a week. Data for 215 admissions were examined for one year before and after admission to the program. T-tests were used to compare service use before and after the intervention, and between completers and non-completers.
Results: The mean duration of treatment was 52 days for program completers and 26 days for non-completers. There was a significant decline in inpatient days before and after the intervention (19.0 days vs. 5.1 days, $p<0.001$), with no significant change in Psych ER visits (1.6 visits vs. 1.5 visits, $p=0.454$). There were three times more non-urgent mental health visits (not including FOCUS visits) in the twelve months after admission to the program than before (3.9 vs. 11.7, $p<0.001$); furthermore, completers attended three times as many non-urgent outpatient visits (not including FOCUS visits) as non-completers (14.4 vs. 5.1, $p<0.001$).
Conclusions: The intervention was associated with a decrease in inpatient days but not ER visits. Results are limited by the pre-post study design and our inability to control for potential unmeasured confounders. Further research is needed in order to determine whether acute partial hospitalization in a population with high disease burden and other determinants of disproportionately low mental health service use might improve outcomes and enhance adaptive service use.

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MENTAL HEALTH SERVICE UTILIZATION PATTERNS IN PATIENTS ADMITTED TO THE FOCUS INTENSIVE DAY TREATMENT PROGRAM AT GRADY HEALTH SYSTEM

Introduction

History and Background:

Partial hospitalization is a psychiatric treatment modality that began in Russia in the 1930's and which has been in evolution since that time (1). It is, by definition, "an outpatient program specifically designed for the diagnosis or active treatment of a serious mental disorder when there is a reasonable expectation for improvement or when it is necessary to maintain a patient's functional level and prevent relapse or full hospitalization (2)." In this study, the terms "partial hospitalization", "day hospital", and "intensive outpatient treatment" are used interchangeably. The term "partial hospitalization program" can refer to a wide array of programs ranging from crisis-oriented acute/shorter-term programs to more long term rehabilitation-oriented programs. This modality of treatment is not a substitute for inpatient care for acutely disorganized and psychotic patients, or for those at imminent risk of suicide, homicide, or imminent physical deterioration for whom inpatient hospitalization is indicated (3). By its very nature, partial hospitalization functions best within a continuum of care. Partial hospitalization programs share boundaries with more intense and restrictive inpatient services, and also with less intensive outpatient office based services. In both instances, a flexible, collaborative collegial relationship is essential for continuity of care and smooth transitions.

In 1963, the US Congress passed the Community Mental Health Act, which mandated

that organizations provide partial hospitalization services in order to meet the definition of a Community Mental Health Center and qualify for federal funding. Subsequently in 1988, reimbursement for partial hospital programs was added to the Medicare program.

Acute partial hospitalization as an alternative to inpatient admission:

The relative clinical and cost effectiveness of partial versus full hospitalization has been the subject of numerous investigations. However, firm conclusions have been elusive, in part because of study heterogeneity and methodological limitations. Reviews have commented on: vague program descriptions, small sample sizes, non-random or unblinded treatment assignment methods, high exclusion rates, and high attrition rates (4). In a 2001 systematic review published by Horvitz-Lennon and colleagues, seven of the ten randomized studies that they reviewed excluded patients up front who were "too severely ill" which, usually referred to psychotic/agitated and suicidal patients. Among those randomized studies which employed upfront exclusion criteria, the median exclusion rate was 56%. The studies which did not employ upfront exclusion criteria, eventually transferred 22% - 61% of partial hospitalization subjects for a minimum of two days of inpatient treatment (5) (6).

The consensus, with regard to clinical outcome, seems to be that there are comparable improvements in psychopathology and social functioning for partial and full hospitalization patients (4). Some studies have suggested different rates of symptomatic and/or functional recovery, whereas others have suggested greater social improvement and less family burden with partial hospitalization (7). In addition, a handful of studies have reported greater patient satisfaction for partial hospitalization (5, 8, 9).

A 2003 Cochrane review reexamined individual patient data from nine randomized controlled trials of day hospital versus inpatient admission for acute psychiatric disorders (n=594). The authors included studies published up to and including December, 2000. The percentage reduction in acute inpatient admissions that could be achieved by diverting appropriate patients to an acute day hospital was found to be between 18.4 and 39.1%.

More recently, in 2007, T. W. Kallert and colleagues published the results of a European multicenter randomized controlled trial aimed at studying the effectiveness of acute day hospital care compared with inpatient treatment in selected urban and rural areas of five European countries. In their study, the percentage reduction in acute inpatient admissions that could be achieved by diverting appropriate patients to an acute day hospital was comparable; between 16.6 and 35.4% (10).

It is important to note that the percentage reduction in inpatient admissions reported in both of these studies is quite modest in comparison with "home care crisis treatment"(a form of assertive community treatment), which according to a 2000 Cochrane Systematic review, can achieve a 45% reduction in acute inpatient admissions when coupled with an ongoing home care package (11).

Fewer and fewer acute partial hospitalization programs exist in the United States. This is partly due to the fact that many mental health providers are not familiar with this treatment modality and also because Partial Hospitalization is frequently not reimbursed by private health insurance companies. In addition, clinical training programs in the United States have rarely included exposure to partial hospitalization programs (12).

An increasingly important factor may be that, as the average duration of inpatient treatments become shorter and shorter (13), and the cost of inpatient care becomes a small proportion of mental health spending, unless partial programs can reduce their treatment durations accordingly, in order to maintain their reputation as cost-effective alternative to inpatient care, they may fall out of favor among payers and health system administrators alike. Dr. Robert Cuyler, former president of the American association for partial hospitalization, predicted in 1991: "As new modalities gain acceptance among both practitioners and payers, their costs must be monitored. From an economic standpoint, partial hospitalization is advantageous today because the cost of a day in that setting is much less than a day of inpatient... If the cost of partial hospitalization begins to escalate and erode that differential, the advantage will obviously be lost"(12). Dr Cuyler also noted: "Marketplace forces have a way of promoting much more rapid change in the delivery of health care than do advances in clinical knowledge."

Summary of clinical outcomes of partial hospitalization

The authors of the aforementioned 2003 Cochrane systematic review on "Day hospital versus admission for acute psychiatric disorders" concluded that the day hospital patients showed positive mental status changes more rapidly than their inpatient counterparts, and were more satisfied with their treatment. However, in contrast to the claims of the nonsystematic reviewers of earlier studies, there was no evidence of reduced readmissions to hospital, nor was there any evidence of relatively enhanced social functioning in the day hospital patients (14).

In the 2007 European Multicenter controlled trial; day hospital care was found to be as effective as conventional inpatient care using standardized measures of psychiatric symptoms, satisfaction with treatment, and quality of life. In contrast with the conclusions of the 2003 Cochrane Review, in this study, random allocation to day treatment was associated with greater improvement in social functioning at the time of discharge and at follow-up (10).

Administrative data for tracking outcomes:

There is emerging evidence that administrative datasets which track system level performance improvement indicators (including health service use) might be useful adjuncts to clinical outcome measures (15). In 1999, Rosenheck and colleagues examined the relationship between administrative performance indicators and clinical outcome measures in a sample of sixty two Department of Veterans Affairs specialized inpatient and residential PTSD programs involving 4,165 veterans. They found that the number of readmission episodes in the six months after discharge from inpatient treatment was associated with poorer outcomes on five of six clinical outcome measures. Indicators related to hospital admission were correlated more strongly with clinical outcome measures than were measures of access, intensity, or continuity of outpatient care. The authors concluded that although they should not be substituted for clinical outcomes measures, administrative indicators have face validity as clinical process measures, are inexpensive, and should be used as a complement to more costly instruments for measuring either global or specific clinical outcomes (15).

Mental health service use as an outcome indicator:

The factors which determine mental health service use are complex and incompletely understood. According to Andersen's behavioral model, health service use is determined by multi-level determinants: individual, health system, and societal (16). Characteristics of the mental disorder, including its severity, duration and associated disabilities, partly explain an individual's predisposition to use services. However, other individual factors including: age, sex, race, income, education, the presence of supportive social network, and health beliefs that enable adaptive health service use, are also important (17). Health beliefs: the attitudes, values, and knowledge that people have about their health, their perceptions of need, and their attitudes about health services, are potentially modifiable. Programs that enhance the accuracy of one's assessment of one's mental state and of one's perceived need for help, and which promote the development of trust in mental health professionals, might also enhance regular and ongoing adherence to recovery oriented mental health services and reduce reliance on crisis oriented services (including psychiatric emergency service visits and acute inpatient hospitalization). Indeed, self-perception of illness severity was found to be the strongest predictor of service use in a recent article by Dhingra et al. wherein Andersen's model was employed to examine the determinants of mental health service use in the 2007 Behavioral Risk Factor Surveillance System (BRFSS) (18).

FOCUS Intensive Outpatient Program Description:

When this study was conceived, the Mental Health Program at Grady Health System in Atlanta, Georgia, was comprised of a continuum of mental health treatment services including: Psychiatric emergency services (PES), a crisis stabilization unit (13CSU), a longer stay inpatient unit (13A), the FOCUS partial hospitalization program, and several

outpatient treatment programs designed to meet the needs of specific patient groups.

FOCUS was in existence from 1999 until 2010. It was a highly structured, intensive, and medically based program that served persons with an active Axis I psychiatric disorder requiring stabilization to avoid inpatient hospitalization. FOCUS also served as a transition from inpatient treatment to community functioning. In established patients, prior connection to our program allowed for earlier discharge from hospital (refer to the discussion section of this paper for further explanation). A main goal of our program was to provide the psychiatric and clinical care and support necessary to enable consumers to safely function in the least restrictive setting. This was accomplished by providing a wide array of outpatient services including: psychiatric assessment, nursing/medical screening, psychopharmacology, group, individual, and family therapy, and very active case coordination and care planning. FOCUS was a time-limited acute service, based on individual needs. Hours of operation were Monday through Friday from 9:00 AM until 2:00 PM. Consumers of the FOCUS program were encouraged to participate in all recreational activities offered through Grady's Adult Day Services. Evening and weekend crisis services were available to through the Grady psychiatric emergency service.

Admission criteria allowed for co-occurring substance use disorders, personality disorders, and medical conditions. Exclusion criteria included conditions that made participation in talking groups unproductive (dementia, mental retardation, severe hearing impairment, or severe disorganization) or which precluded safe outpatient treatment (delirium, active aggression, acute substance intoxication or active suicidal ideation or intent). The FOCUS program served many individuals who were impoverished, had no

health insurance, who were currently or had recently been homeless, who had involvement with the criminal justice system, and who had been victims of trauma. (For further information about the FOCUS program, see Appendix II; Contextual Considerations).

This study examines 215 consecutive admissions to the FOCUS partial hospitalization program. Subjective evaluations by health system clinicians and administrators have suggested that the FOCUS program improves psychiatric symptoms and overall functioning, however the question of whether the FOCUS program decreases hospitalizations or improves other outcomes remains unknown.

Due to system constraints, the only clinical outcome measure we were able to implement was change in GAF score. FOCUS attending psychiatrists began assigning Global Assessment of Functioning (GAF) scores to all patients on admission and discharge from FOCUS in April, 2005, as part of an organizational quality improvement initiative. The GAF is the most widely used instrument for the assessment of global severity of illness (19). Extant research suggests that the cautious use of a GAF derived scale has discriminant validity for measuring changes in mental health status over time (20). Nonetheless, there are substantial limitations to using a single clinician-rated outcome measure such as the GAF in evaluating the effectiveness of a treatment or program (21-23). Further, the GAF as it is was assigned in our program is at substantial risk of measurement bias since the psychiatrists who assigned the scores on admission and then again at discharge were aware that an improvement in GAF of 10 points or more was being used as a health system performance indicator of adequate clinical

improvement for this program. Further, the admission GAF score was available for review on the same document on which the discharge GAF was recorded.

Research Questions: Controlling for all of the following variables: age, gender, race, socioeconomic status, the presence of a psychotic disorder on Axis I, the presence of a co-occurring personality disorder on Axis II, substance use disorder co-morbidity, and the presence of co morbid medical conditions, did patients who were admitted the FOCUS program utilize mental health services more adaptively during the 12 months following admission to FOCUS as compared with the 12 months prior to the date of admission?

When examining mental health service use at Grady, the data were divided into inpatient admissions and outpatient visits. Outpatient visits were further sub-divided into emergent and non-urgent visits. Outpatient visits between the dates of admission to and discharge from FOCUS were not included in the analysis.

When examining inpatient data, we looked at the number of psychiatric inpatient admissions and the number of inpatient days separately.

Finally, we grouped subjects according to whether they had fully completed their treatment at FOCUS or had dropped out (for any reason). We then compared patterns of mental health service use between completers and non-completers in the twelve months prior to and following admission to FOCUS. (See Appendix I for detailed study hypotheses).

Methods

Study Design:

This is an observational study; employing a retrospective cohort design utilizing pre-existing administrative and clinical records in both paper and electronic formats at Grady Health System. We conducted pre and post treatment comparisons with individuals acting as their own controls. In addition, those who completed the program were compared to those who did not. Study periods were twelve months prior to and after the index partial hospitalization admission date**.** For non-urgent outpatient mental health visits, however, we examined the twelve months before the date of admission to FOCUS and the twelve months after the date of discharge from FOCUS (so as to avoid counting FOCUS program visits in the analysis. This would have inflated the number of non-urgent outpatient mental health visits after the date of admission to FOCUS and hence would have biased the results).

Sample size**:**

I used the online sample size calculator atwww.danielsoper.com/statcalc/calc01.aspx to determine that it is necessary to have a minimum sample size of 113 in order to detect a 15% pre to post-treatment reduction in psychiatric emergency service visits and inpatient psychiatric treatment days at Grady Health System. The parameters utilized in the sample size calculator were as follows: alpha = 0.05, beta = 0.80, with nine candidate predictor variables for multiple regression analysis. Data were extracted from the discharge summaries and entered manually into a Microsoft Excel 2007 spreadsheet in January, 2010.

Data sources, abstraction and linkage to Grady administrative datasets:

Data including medical record number, the dates of admission and discharge from FOCUS, five axial DSM-IV-TR diagnoses, and admission and discharge GAF scores, were extracted from 215 paper discharge summaries on every patient who had completed the FOCUS admission process at FOCUS between November, 2004 and December, 2007. These data were indexed by Grady Medical Record number and entered manually into a Microsoft Excel spreadsheet in January of 2010. There were a total of 181 individuals; 34 of the 215 admissions were a second or third admission within that timeframe.

In July of 2010, we transformed the Excel table into Microsoft Access format and imported the FOCUS data to a database management system (DBMS) located on an Emory University Server in the Diabetes Unit, Feebeck Hall at Grady. This database is populated by administrative downloads from Grady Information Services. Co-investigator, Dr David Ziemer is the administrator of this database ("the Grady Diabetes Patient Tracking System") which includes information about all admission and outpatient events at Grady Health System. These data are stored with: medical record number, date of birth, race, service location, zip code, insurance status (eligibility codes, financial codes), and ICD-9 diagnostic and CPT procedure codes. The inpatient information goes back to November 1999 and is updated from the parent database annually. The outpatient data also go back to 1999 and are updated weekly. The Oracle functions allow searching and aggregation based on any of the stored values.

Human Subjects and Confidentiality issues:

Informed consent: This study was granted a complete HIPAA waiver. We did not obtain informed consent from study participants because this study was a minimal risk, retrospective study of pre-existing records.

IRB approval: A study protocol was submitted to the Emory University eIRB on 2/25/08 (IRB#00008814) with Drs Benjamin Druss and David Ziemer identified as co-investigators. It was approved under the expedited review process (with a complete HIPAA waiver). The study was granted expedited approval for continuation and is valid until 11/23/2011.

Data Analysis Procedure:

Data analysis was done using the SPSS Statistics 17.0 software package.
We used linear regression modeling to control for the variables to which we had access in the dataset and which we hypothesized might impact service use: age, gender, race, the presence of a co-occurring personality disorder on Axis II, the presence of a substance use disorder, and the presence of any co morbid medical condition on Axis III. The results were not influenced by the inclusion of the control variables in the model, therefore only the univariate results are presented.

We used the dependent means t-test to test the pre-post hypotheses for all FOCUS subjects (see Appendix I; hypotheses 1-4). We then used the independent means t-test for the hypotheses which compared service use in subjects who completed versus those who did not complete a course of treatment (see Appendix 1; hypotheses 5-8). In addition, we used the independent means t-test to stratify the analysis for the following

variables of concern: gender, race, co-occurring substance use disorder, co-occurring personality disorder or co-occurring medical conditions.

Results

Study Sample Characteristics:

Age /Gender/ Race:

The mean age of subjects at the time of admission to FOCUS was 34.2 years (standard deviation=12.0 years). 62% of the subjects were male; 38% were female. The overwhelming majority of patients identified as African American (81%). Only 16% of subjects were Caucasian and a small fraction (3%) classified themselves as Asian, Hispanic, African, or of mixed racial origin. **There were no significant differences in any of these categories between subjects who had completed and those who had not completed the program** (see TABLE I)

Income/Socio-economic status:

Approximately half of FOCUS subjects had provided the Grady financial counseling office with documentation in support of a full discount Grady Card. (47.8% of those individuals had household incomes at or below 125% of Federal Poverty Guidelines (FPG); an additional 3.3% reported their household income to be between 126% and 250% of FPG. Fully 31.9% of subjects had expired Grady Cards (which likely reflects both limited resources and mental status impairment). 12.1% had presented insufficient documentation of income to qualify for a discount at the time when bills were submitted. 2.7% of subjects were classified as “pending Medicaid”. Discount eligibility data were missing for 2.2% of subjects.

Diagnostic characteristics:

Fully 178 (83%) of the 181 FOCUS subjects suffer from severe Axis I disorders; i.e. disorders characterized by prominent psychotic features (schizophrenia spectrum

disorders and mood disorders with psychotic features). In addition, there was a great deal of psychiatric, substance abuse, and medical co-morbidity in our subjects; 147 (68%) had a co-occurring personality disorder; 158 (74%) had one or more substance use disorders; 122 (57%) of our subjects had one or more Axis III conditions; and 34 (16%) of our subjects had one or more conditions consistent with an evolving metabolic syndrome (overweight or obesity, hypertension, hyperlipidemia, and diabetes). **There was no significant difference between the subjects who completed the program and those who did not in any of these diagnostic categories** (see TABLE III).

Mental Health service utilization results:

Number of psychiatric inpatient admissions:

Of the 181 FOCUS subjects, 105 had at least one psychiatric inpatient admission between the twelve months before and the twelve months after the date of admission to FOCUS. ***There were significantly more psychiatric inpatient admissions in the twelve months before as compared with the twelve months after focus completion (1.4 admissions vs. 0.4 admissions; p<0.001)(see TABLE VII).***

When program completers were compared with non-completers, there was no significant difference either in the twelve months before or after FOCUS admission (p=0.868 & p=0.735) (see TABLE VIII).

Interestingly, of all of the categorical demographic and diagnostic variables examined (age, gender, race, presence of co-occurring personality, substance use, or medical disorder), ***the presence of a co-occurring personality disorder alone had a significant***

positive correlation with the mean number of psychiatric inpatient admissions after* FOCUS *discharge (0.48 admissions vs. 0.08 admissions; p<0.002) (see TABLE IX).

Number of psychiatric inpatient days:

There was also a significant reduction in the mean number of psychiatric inpatient days in the twelve months after as compared with the twelve months before FOCUS admission (18.95 days vs. 5.11 days; p<0.001) (see TABLE X).

When program completers were compared with non-completers, there was no significant difference either before (p=0.275) or after FOCUS admission (p=0.529) (see TABLE XI).

Once again, of the categorical demographic and diagnostic variables examined, ***only the presence of a co-occurring personality disorder had a significant positive correlation with the mean number of psychiatric inpatient days after FOCUS admission (5.82 days vs. 0.15 days; p<0.001) (See TABLE XII)***

Psychiatric Emergency Service Visits:

Of the 181 FOCUS subjects, only 126 had at least one psychiatric emergency service visit between the twelve months before and the twelve months after the date of admission to FOCUS. ***There was no significant difference in the mean number of psychiatric emergency service (PES) visits in the twelve months before as compared with the twelve months after focus completion (1.6 visit vs. 1.5 visits; p=0.454)(see TABLE IV).***

There was also no significant difference when program completers were compared with non-completers either before (p=0.272) or after (p=0.196) (see TABLE V). None of the categorical demographic and diagnostic variables examined (age, gender, race, presence of co-occurring personality, substance use, or medical disorder), were

found to have a significant impact on the mean number of PES visits after FOCUS discharge **(*see TABLE VI*).**

Number of Non-urgent Psychiatric Outpatient Visits (excluding visits made DURING admission to FOCUS):

Of the 181 FOCUS subjects, 177 had at least one non-urgent psychiatric outpatient visit between the twelve months before FOCUS admission and the twelve months after the date of discharge from FOCUS. ***There was a significant increase in the mean number of non-urgent psychiatric outpatient visits in the twelve months after discharge as compared with the twelve months before the FOCUS admission date (3.9 visits vs. 11.7 visits; p<0.001) (see TABLE XIII).***

When program completers were compared with non-completers, there was a significantly higher number of non-urgent psychiatric outpatient visits after FOCUS discharge for completers (14.4 visits vs. 5.1 visits; p<0.001) (see TABLE XIV).

None of the categorical demographic and diagnostic variables examined (age, gender, race, presence of co-occurring personality, substance use, or medical disorder), were found to have a significant impact on the mean number of non-urgent psychiatric outpatient visits after FOCUS discharge (see TABLE XV).

Reason for discharge:

Of the 215 admissions, 145 (67%) were discharged after completing a full course of individualized treatment. Only 9 (4%) subjects left because of mental status deterioration requiring acute psychiatric inpatient admission. 41(19%) subjects dropped out of treatment without explanation; 3 (5%) were incarcerated, and 2 (3%) subjects required

inpatient admission for medical reasons. 15 (7%) subjects left for reasons coded as "other".

Duration of Treatment and change in Global Assessment of Functioning scores in FOCUS completers and non-completers:

The mean duration of treatment was 52 days (SD=28.35) for the FOCUS subjects who completed a full course of treatment, and 26 days (SD=18.26) for those who did not ($p<0.001$).

Dropping out of treatment for any reason was associated with significantly less improvement in Global Assessment of Functioning (GAF) score. Indeed, GAF scores increased by an average of 15.8 points for completers (SD=9.0); whereas subjects who left without completing the program only improved by an average of 1.8 points (SD=1.77) ($p<0.001$) (see TABLE II).

Discussion

The FOCUS patient population carries a very high burden of disease (with 83% of individuals suffering from psychotic disorders, 68% with co-occurring personality disorders, 74% with co-occurring substance use disorders and 57% with co-occurring medical conditions). In addition this study documents the fact that our subjects have other characteristics documented in the research literature to be associated with disproportionately low mental health service; severe mental illness, low socio-economic status, and racial/ethnic minority status (24, 25). Nonetheless, fully 145 (67%) of study subjects completed treatment and left the program at a mutually agreed up scheduled discharge date.

Inpatient admission while in FOCUS:

Only nine (4%) subjects were discharged early because of mental status deterioration requiring acute inpatient admission. This surprisingly low rate of acute inpatient hospitalization in our unselected but severely ill population might be, at least in part, attributable our administrative policy of only discharging patients from FOCUS when they were admitted inpatient if they were admitted to another facility. Subjects who were admitted to Grady's inpatient psychiatry units were placed on "leave" and hence were not administratively discharged until they had completed FOCUS or left for other reasons. In addition, while in FOCUS, study subjects were seen by their attending psychiatrists at least twice weekly (once individually and once in group). Further, daily multidisciplinary clinical rounds facilitated communication between providers; physicians were alerted when patients showed signs of deterioration, or were out of their medication. This

practice may have, at least in some cases, prevented acute inpatient hospitalization as acute partial hospitalization programs are designed to.

Mental Health Service Use results

Inpatient visits & inpatient days:

The number of inpatient days before the first FOCUS admission is unlikely to have been reduced by the inpatient team's plan to refer to FOCUS, since through much of the study period there was a 2-3 week waiting period from the time of referral to the scheduled intake date. However, the significant reduction in inpatient days (from a mean of 19 days to 5 days) following admission to FOCUS may be, at least in part, due to the close collaboration that developed between the FOCUS and Grady inpatient clinical staff. When patients who either were or had been in FOCUS were admitted inpatient, FOCUS staff were notified by inpatient staff and in most cases, FOCUS staff visited the patient and encouraged them to come back to FOCUS after discharge. This close collaboration, established therapeutic relationship with, and easy transition to FOCUS may have contributed to the reduced mean number of days spent in hospital following FOCUS admission for all patients.

Another possible explanation relates to the phenomenon of "regression toward the mean"; whereby we may have measured our subjects at a point of high service use prior to FOCUS admission, and they then shifted to a lower level of mental health service use afterwards unrelated to the intervention. Regression toward the mean is a distinct possibility given the limitations of our pre-post study design.

In addition, during the course of the study, there may have been Grady Health System changes impacting the frequency and duration of inpatient admissions (completely unrelated to the intervention). Another possible confounder, which we were unable to measure, is the possibility either before or after admission to FOCUS, that our patients may have sought mental health care outside of Grady Health System. This study of mental health service use is limited by the fact that we were only able to access service use data for Grady Health System; hence all of the inpatient and outpatient mental health service use which took place outside of Grady was unmeasured.

PES visits:

We were surprised at the PES findings which showed no difference in pre-post PES visits. Indeed it was a somewhat surprising that the mean number of PES visits was only 1.6 in the twelve months before and 1.5 in the twelve months after admission. The surprisingly low level of psychiatric emergency service use among our patients might be explained by the significant challenges faced by that service during the study period. Indeed throughout the study period, the PES was understaffed, and waiting times commonly stretched beyond 8-12 hours.

Non-urgent outpatient visits

The most interesting findings relate to the overall three-fold increase in non-urgent mental health outpatient visits (from 4 to 12) in the twelve months following admission compared with the twelve months prior to FOCUS admission (not counting FOCUS visits). As mentioned earlier in the discussion, when completers and non-completers were compared, there was a substantial difference in favor of completers (who attended 14 visits in the twelve months following FOCUS discharge, compared with a mean of 5

visits for non-completers). By comparison, in the NIMH ECA program study, the average number of health system visits per treated person per year in ambulatory settings was 13.3 (24). Of note, the ECA population had a far greater proportion of Caucasian, higher socioeconomic status subjects with lower substance abuse co-morbidity than our study population. Regular outpatient mental health visits in a population with high disease burden (such as our study subjects) might positively impact symptom control, community functioning, and quality of life and thereby reduce the need for crisis services and inpatient admission These findings can be tied to the concept that FOCUS treatment may have altered our patient's "health beliefs" (a determinant of health service use, according to Andersen's behavioral model) leading to more "adaptive and appropriate" use of non-urgent outpatient mental health care.

Comparing Program completers to non-completers:

Four of our study hypotheses related the question of whether there were mental health service use differences between program completers and non-completers (Appendix I; hypotheses 5-8). What follows is a description of the process of scheduled program completion/graduation to assist the reader in interpreting the study results which relate to those hypotheses.

How does a patient become a program completer?

The discharge planning process was initiated on admission to FOCUS. Individualized treatment goals were developed collaboratively with the patient. Common benchmarks suggesting readiness for discharge included: improvement in symptom control (often achieved jointly through adherence to medication and abstinence from substance misuse), regular program attendance, active engagement in group therapy, the utilization of

adaptive coping skills, improved insight, and the development of not only a mental health treatment follow-up plan, but also a recovery plan (which might include referral to and acceptance into a psychosocial rehabilitation program, a peer center, vocational rehabilitation counseling, or in some cases, a return to work or studies).

Program completers and non-completers were similar in all demographic and diagnostic categories. The only difference between completers and non-completers in any of the service use outcomes related to non-urgent mental health visits after FOCUS discharge; where completers attended an average of 14 visits, and non-completers attended only 5 visits in the twelve months following FOCUS discharge. We had expected non-completers to utilize the PES and inpatient treatment more than program completers, given the difference in GAF scores between completers and non-completers, and their precarious mental state upon discharge.

Possible explanations for our findings:

Perhaps the GAF findings were biased since when physicians were coding the discharge GAF, they had access to the admission GAF. As well, they were aware that the patient had left prematurely, which may subtly influence them to rate the discharge GAF lower. It may be that having left FOCUS early, the non-completers did not receive a sufficient duration or intensity of the treatment (a high enough “dose”, if you will) in order to effect a significant clinical/functional improvement and a change in their health beliefs thereby enhancing adaptive service use. It may be that four weeks of intensive outpatient treatment (26 days) is insufficient, not only to effect significant clinical/functional improvement in this population, but also to significantly change a patient’s health beliefs; in particular with regard to self-perception of illness, perceived

need for help, and the development of trust in mental health professionals all of which would enhance help seeking behavior not only in crisis but also when seeking non-urgent assistance for symptomatic improvement and help in achieving recovery.

It is also possible that there might be related some other unmeasured factor or factors disproportionately affecting the non-completer group, causing early drop out, failure to improve in symptoms and functioning, and negatively impacting subsequent mental health service use. Perhaps indeed, unmeasured factors such as: referral source, marital status, quality and extent of family and social support, housing status/homelessness, and cultural/religious beliefs about mental illness might have differentially impacted their adherence to treatment.

It is possible that program non-completers, like completers, had access to FOCUS clinicians for crisis-related services (these were provided, whenever possible to any patient we had treated, regardless of whether they had completed treatment or not) and as a result did not need to utilize the PES and/or did not deteriorate to the point of requiring inpatient admission.

It is also possible that mental health services were indeed accessed; just outside of Grady Health System. Transportation difficulties were reported by many patients to be a significant contributor to program nonattendance and an overall barrier to treatment.

<u>Personality disorder findings:</u>

The presence of a co-occurring personality disorder did predict more inpatient admissions and days in hospital in the twelve months after FOCUS admission.
The positive association with the presence of a personality disorder and inpatient service use after discharge from FOCUS is consistent with the personality disorder literature.

Extant research examining the relationship between personality disorder diagnoses and mental health service use reveals that compared with patients who suffer from major depressive disorder without a comorbid personality disorder; individuals with personality disorders tend use more inpatient, outpatient, and psychopharmacologic treatments of all kinds (26). The interesting absence of a significant association between the presence of a co-occurring personality disorder and after-FOCUS non-urgent mental health visits may relate primarily to the fact that treatment-related modification of health beliefs leading to more adaptive mental health service use was no different between patients with and without a comorbid personality disorder.

CONCLUSION; STUDY IMPLICATIONS AND FUTURE DIRECTIONS

The FOCUS intervention was associated with a decrease in inpatient days but not PES visits. In addition, completion of the FOCUS program was associated with higher rates of non-urgent mental health follow-up in the year following admission. Unfortunately, the program was closed before the data were analyzed and the results could be reported to executive level decision-makers at Grady.

Nonetheless, outcomes research does not always drive practice patterns (12). In many cases, economic factors are primary. Despite the fact that untreated and undertreated mental illness incurs high financial costs to society (27). These costs are hard to track and, unfortunately are of little consequence to health care executives when it comes time to review budgets and plan programs in a system of care.

In 1991, Cuyler predicted that "as the pressure to curtail inpatient hospitalizations continues, partial hospitalization will likely face a substantial change in its role in the mental health continuum ... Increasingly seen as the entry point into psychiatric care for the moderately to severely mental ill, partial hospitalization could be shifted into a gate-keeping role; and patients could be hospitalized only after they failed to make sufficient progress… If that shift occurs, greater diagnostic and assessment services will be needed in partial hospitalization programs. And if such a shift increases the acuity of partial-hospitalization patients, practitioners will have to maintain a viable treatment milieu while addressing and ameliorating symptoms of the acutely ill and acutely disruptive."(12)

In high acuity, low resource populations such as were treated at FOCUS, some of the greatest barriers to treatment involved: limited access to adequate housing, trouble accessing prescribed medication, and trouble getting transportation to and from programming.

The day hospital/crisis respite care model reported by Sledge et al. in 1996 which combined crisis residential services with a day hospital program, diverted 24% of patients away from inpatient admission, while producing similar outcomes in: symptoms, functioning, social adjustment, and quality of life. Further, combined day hospital/crisis respite care was, on average 22% less expensive than inpatient hospitalization for patients with psychotic disorders (and even less expensive for less severe disorders).

Future research should examine models of care which combine day hospital treatment programs with access to safe housing, transportation and supervised medication administration for high needs populations like those treated at the Grady FOCUS program. In addition, more robust study designs are needed in order to determine whether programs like FOCUS, which serve patients with a high disease burden and other determinants of disproportionately low mental health service use, are beneficial in terms of: clinical and functional outcomes and enhanced adaptive mental health service use.

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APPENDICES

1. **Appendix I; Study Hypotheses:**

Pre/Post hypotheses for FOCUS completers

Hypothesis #1

Ho: μd = 0

Ha: μd ≠ 0

Where μd is **the mean of the difference in the number of psychiatric emergency service (PES) visits in the 12 months prior to and the 12 months following admission** among those patients with severe mental illness who receive care at the FOCUS program at Grady Health System.

Hypothesis #2

Ho: μd = 0

Ha: μd ≠ 0

Where μd is **the mean of the difference in the number of psychiatric inpatient admissions in the 12 months prior to and the 12 months following admission** among those patients with severe mental illness who receive care at the FOCUS program at Grady Health System.

Hypothesis #3

Ho: μd = 0

Ha: $\mu d \neq 0$

Where μd is **the mean of the difference in the number of inpatient mental health days in the 12 months prior to and the 12 months following admission** among those patients with severe mental illness who receive care at the FOCUS program at Grady Health System.

Hypothesis #4

Ho: $\mu d = 0$

Ha: $\mu d \neq 0$

Where μd is the **mean of the difference in the number of non-urgent psychiatric outpatient visits in the 12 months prior to and the 12 months following admission** among those patients with severe mental illness who receive care at the FOCUS program at Grady Health System.

Hypotheses involving FOCUS completer vs. non-completers

Hypothesis #5

Ho: $\mu 1 = \mu 2$

Ha: $\mu 1 \neq \mu 2$

Where μ1 is the mean number of psychiatric emergency service visits in the twelve months after the admission date among patients **who successfully complete FOCUS**.

μ2 is the mean number of psychiatric emergency service visits in the twelve months after the admission date among those patients who were admitted but did **not fully complete a course of FOCUS treatment**.

Hypothesis #6

Ho: μ1 = μ2

Ha: μ1 ≠ μ2

where μ1 is the mean number of psychiatric inpatient admissions in the twelve months after the admission date among patients **who successfully complete FOCUS.**

μ2 is the mean number of psychiatric inpatient admissions in the twelve months after the admission date among those patients who were admitted but **did not fully complete a course of FOCUS treatment**.

Hypothesis #7

Ho: μ1 = μ2

Ha: μ1 ≠ μ2

where μ1 is the mean number of psychiatric inpatient mental health days in the twelve months after the admission date among those patients **who successfully complete FOCUS.**

μ2 is the mean number of psychiatric inpatient mental health days in the twelve months

after the admission date among those patients who were admitted but **did not fully complete a course of FOCUS treatment**.

Hypothesis #8

Ho: $\mu 1 = \mu 2$

Ha: $\mu 1 \neq \mu 2$

where $\mu 1$ is the mean number of non-urgent psychiatric outpatient visits **in the twelve months after the discharge date** among those patients **who successfully complete FOCUS**.

$\mu 2$ is the mean number of non-urgent psychiatric outpatient visits **in the twelve months after the discharge date** among those patients who were admitted but **did not fully complete a course of FOCUS treatment**.

APPENDIX II; CONTEXTUAL CONSIDERATIONS

FOCUS Intensive Day Treatment Program; history and program description

- Conceived of, and initial grant application for funding from the State of Georgia was written by Keith Wood, PhD.
- Ann Roy and Katie Porter, M.D. opened the doors in 1999.
- Leanne McBurney-Raison, M.D. was medical director from 2000-2002.
- Karen Hochman, M.D. became medical director in 2002 until FOCUS closed in July, 2010.

The FOCUS Program was created to:

- Expand the continuum of psychiatric services provided by the Grady Health System.
- Prevent repeated inpatient hospitalizations.
- Decrease the length of inpatient treatment.
- Assist with patients' successful reintegration into the community.
- Prevent inpatient hospitalization for patients with Axis I disorders that could not be adequately managed in a less intense outpatient setting.
- Provide emotional, psychiatric, and medical support to improve the quality of life of Grady FOCUS patients.

FOCUS Admission Criteria:

- Aged 18-64 years.

- Has an active AXIS I psychiatric disorder requiring stabilization to avoid inpatient hospitalization.
- Or
- Intensive day program would allow earlier discharge from inpatient treatment.
- Or needs more intensive treatment than can be offered with regular outpatient treatment in order to assist in successful transition from inpatient treatment to community functioning.
- May have co-occurring substance use disorder, but this cannot be the primary diagnosis.
- May have co-occurring personality disorder.
- For patients being referred from the community, attempts to stabilize the patient in outpatient treatment have been unsuccessful.
- May require a structured program to prevent relapse to substance use.
- May require medication stabilization with more intensive psychiatric attention than can be provided in regular outpatient treatment.
- Would benefit from verbal psycho-educational groups and/or psycho-therapeutic groups.
- May need assistance with medication adherence and benefit from learning more about mental illness and healthy coping strategies.

FOCUS exclusion criteria:

- Dementia (known or strongly suspected)
- Mental retardation (or verbal IQ very low such that participation in talking groups would be problematic)

- Active suicide risk or substantial risk of aggression to self or others.
- Thought processes too disorganized to participate in verbal groups.
- Physical disability precludes safe attendance at our program location.
- Severe hearing impairment or visual impairment may preclude participation

Services provided included all of the following:

- Psychiatric assessment, nursing/medical screening, psychopharmacology, group therapy, case management, family support, individual therapy,
- We actively worked to develop relationships with community agencies who shared in the care of our members
- We provided education about substances of abuse and their effect on mental illness and functioning.

Group Topics:

Relapse Prevention

Psychotherapy

Assertiveness Training

Managing Anxiety

Coping and Communicating

Psychopharmacology ("Medication for Recovery")

Relaxation Techniques

Safety and Boundaries

Happiness and Depression

Family Group

Spirituality

Assessment of Treatment and Progress

Managing Psychosis

Review of Plans for the Weekend

Nutrition/Diet

As part of the continuum of mental health services at Grady Health System, FOCUS was funded in part by State Grants and in part by fee for service billings generated for professional services rendered under the Georgia Medicaid Rehab Option. Both Grady Health System and the State of Georgia experienced significant budget shortfalls, especially during the last five years of FOCUS's existence. The State responded by reducing the fee paid for professional services and by increasing pre-authorization and other documentation requirements which consumed increasingly large amounts of administrative time on the part of clinicians.

Grady health system's mission is and always has been to serve the underserved of Fulton and DeKalb Counties. Consequently, budget deficits have always been a fact of life at Grady. However, in large part because of the advent of "Managed Medicaid" in January of 2006, Grady's budget deficit gradually reached crisis levels and threatened to close the hospital by the end of 2007. Throughout this time, the health center went through numerous leadership changes; each CEO had their own unique approach to the budget shortfalls and associated system challenges. Over the years, the FOCUS program lost key staff beginning with the firing of a full time secretary, followed by the resignation of a social worker, and the subsequent elimination one of the program's two full time social work positions; which was never replaced.

Nonetheless, clinical staff were expected to share all of the program's clerical duties, while continuing to provide excellent care, with the pressure to increase the patient census (in order to increase billings), while paperwork requirements became increasingly complex and time consuming.

In early 2010 two new administrators were hired at Grady to oversee the Mental Health Programs. Initially the new administrators were impressed by the reputation of our program. They restored a secretarial position and then assigned a substance abuse counselor to the program. However when the medical director was unwilling to increase the patient census to the administrator's target of an average daily census of forty, the administrators decided to close FOCUS effective July 31, 2010.

At the time of its closure, FOCUS had 1.5 FTE psychiatrist time, 1.0 FTE registered nurse, 0.5 FTE nurse practitioners, 1.0 FTE licensed social worker, 1.0 FTE licensed professional counselor with expertise in addictive disorders, 2FTE mental health associates, and 1.0 FTE secretary. The average daily patient census ranged from 15-20 at any given time.

Sledge et al., in 1996 described their CMHC day hospital staffing as follows (for a maximum census of 20 patients); "the direct patient care staffing for the day hospital during the time of the study included the full time equivalents of two to three psychiatrists, two to three nurses, two social workers, two to three occupational therapy/recreational therapy workers, and three to four mental health workers."(28)

APPENDIX III; DATA STRENGTHS AND LIMITATIONS (AND WHY THIS STUDY DESIGN WAS USED)

Study Design limitations:

We had originally planned to compare the FOCUS subject mental health service use data with that of control subjects. Our intention was to use propensity score matching to select controls subjects with similar demographic, diagnostic, and pre-admission service use characteristics from a pool of 10,000 potential controls pulled from the oracle database. However, we did not have the statistical expertise to do this and were unable to find someone who had this expertise to help us. Hence, we decided to modify the study to the current pre-post study design.

Other Data Limitations:

As mentioned earlier, the FOCUS program was part of the Grady Health System and, as such, struggled with financial and staffing issues throughout its tenure. In addition, medical records were not readily available for chart review, and if they had been, our ability to conduct retrospective chart reviews would have remained hampered by the fact that we had no staff to do the chart reviews. Consequently, we were unable to access data for several variables of interest including: referral source, time to intake from the initial referral date, type of housing, marital status, and family/social support.

As well, if we had the time and the resources, we would have wanted to utilize a validated symptom/community functioning outcome measure, a patient satisfaction questionnaire, and a health related quality of life measure in order to enhance the validity and scope of our outcomes study.

The records used were copies of discharge summaries written by FOCUS staff for every patient who had completed the admission process. The original copy was sent to the medical records department. As mentioned earlier, medical records at Grady were elusive at times. For that reason, FOCUS clinical staff kept binders with copies of the discharge summaries in case questions about a patient's diagnoses, medication regimen, or discharge follow-up arrangements should arise. It was impossible to determine if some of the discharge summaries were missing.

Assessment of the Quality of Acquired Data:

1. ***Completeness:*** There were some data elements missing from the paper discharge summaries from which I abstracted information and from which I built the initial dataset in Microsoft Excel. The most common missing field was "discharge GAF" score. In terms of the data that were obtained from the Grady Diabetes Patient Tracking System, and Oracle database; it is likely that there are missing outpatient visit data in the billing dataset given the fact that a recently conducted internal audit revealed that only a fraction of Mental Health clinical encounters were being sent through to Grady's billing department
2. ***Validity:*** There were several instances where we uncovered invalid data from the oracle database. For example, there were two individuals who had been registered into the Grady Administrative database as both male and female at different times. In addition, there were both alphabetic and numeric codes entered in the "FC" column of the document, in 1998, financial eligibility codes were numeric. In 2006, they became alphabetic. Data in the FC column of the dataset, (which are for 2003) include both

numeric and alphabetic codes, which were not concurrently valid codes types (and were likely entered in error by clerical staff).

3. ***Timeliness:*** These data meet timeliness criteria; all data obtained were for the specified time period of the study.
4. ***Consistency:*** These data contain few identified contradictions (see gender example under number 2 above).
5. ***Accuracy:*** The data elements in the Grady Diabetes Patient Tracking System, and Oracle database were not always accurate
6. ***Uniqueness:*** Yes, the data meet the uniqueness criteria. There were however, separate records with duplicate medical record numbers. However, in each of these cases, this represented a specific individual being re-admitted to our program within the timeframe of the study
7. ***Relatability:*** In the dataset that Dr Ziemer and I created, I have all the data I need for this study. However, I had to enter FOCUS data from paper records into Microsoft Excel, convert them into Microsoft Access format, and then combine these with data from the Grady Diabetes Patient Tracking System, and Oracle database in order to obtain all the data segments that I need for the study.

TABLES:

TABLE I; DEMOGRAPHIC DATA:

Variable	All FOCUS subjects	FOCUS completers only	FOCUS non-completers only	Statistical test	Is difference significant?
N=	177	125	52		
Age in years at admission	Mean=34.2 SD=12.0	Mean=34.6 SD=11.5	Mean=33.3 SD=13.1	**independent means T-test**	No P=0.523 t=0.642 Df=85.5
Gender	Male=110 (61.1%) Female=67 (37.9%)	Male=76 (60.8%) Female=49 (39.2%)	Male=34 (65.4%) Female=18 (34.6%)	**Cross-tabs**	No P=0.567 Pearson Chi-square=0.328 Df=1
Race	Black=143 (80.8%) White=28 (15.8%) Other=6 (3.4%)	Black=99 (79.2%) White=21 (16.8%) Other=5 (4.0%)	Black=44 (84.6%) White=7 (13.5%) Other=1 (1.9%)	**Cross-tabs**	No P=0.797 Pearson chi-square=1.663 Df=4

TABLE II; DURATION OF TREATMENT AND CHANGE IN GAF SCORE:

Variable	All subjects	Completers	Non-completers	Independent samples t-test; Equal variances not assumed
Days in FOCUS	MEAN = 43.4 SD=28.27 N=214	MEAN=**51.79** SD=28.35 N=145	Mean= **25.71** SD=18.26 N=69	**(p<0.001)*** T=8.098 Df=193.4
Mean change in GAF score	Mean=11.37 SD=10.86 N=180	Mean=**15.81** SD=9.0 N=123	Mean=**1.77** SD=8.0 N=57	**(p<0.001)*** T=10.55 Df=122.2

***statistically significant difference**

TABLE III; DIAGNOSTIC PROFILE OF FOCUS SUBJECTS

Diagnostic category	**All Focus subjects N=215 (100%)**	**Completers only N=145 (100%)**	**Non-completers only N=70 (100%)**	**Significant difference between completers and non-completers?** **(Pearson chi square statistic/two sided test)**
Psychotic disorder on Axis I? (includes: schizophrenia spectrum, psychosis NOS and mood disorders with psychotic features)	Yes= 178 (82.8%) No = 37 (17.2%)	Yes = 123 (84.8%) No = 22 (10.2%)	Yes = 55 (78.6%) No = 15 (21.4%)	No Chi square = 1.297 Df=1 (p=0.255)
Co-occurring personality disorder	Yes = 147 (68.4%) No = 24 (11.2%) Deferred = 44 (20.5%)	Yes = 93 (64.1%) No= 19 (13.1%) Deferred =33 (22.8%)	Yes = 54 (77.1%) No = 5 (7.1%) Deferred =11 (15.7%)	No Chi square = 3.815 Df=2 (p=0.148)
Co-occurring substance use disorder	Yes =158 (73.5%) No =57 (26.5%)	Yes =109 (75.2%) No = 36(24.8%)	Yes = 49(70%) No = 21(30%)	No Chi square = 0.648 Df=1 (p=0.421)
Co-occurring medical condition of any kind	Yes =122 (56.6%) No =93 (43.4%)	Yes = 80 (55.2%) No = 65 (44.8%)	Yes = 42 (60%) No = 28 (40%)	No Chi square = 7.497 Df=9 (p=0.585)
Co-occurring metabolic syndrome disorder	Yes = 34 (15.8%) No = 181 (84.2%)	Yes = 23 (15.9%) No =122 (84.1%)	Yes = 11(15.7%) No = 59 (84.3%)	No Chi square = 0.001 Df=1 (p=0.978)

PSYCHIATRIC EMERGENCY SERVICE (PES) VISITS

TABLE IV; Pre and post (paired t-test) all subject results

Variable	Mean # PES visits	Standard deviation	N	Test statistic One sample t-test Significance (2 tailed)
Sum of before FOCUS PES visits	1.61	1.97	126	T=0.752 Df=125 P=0.454
Sum of after FOCUS PES visits	1.46	1.97	126	

TABLE V; FOCUS completers vs. non-completers (independent t-test results)

Variable	Completed FOCUS?	Mean # PES visits	Standard deviation	N	Test statistic Independent samples t-test for equality of means Equal variances not assumed Significance (2 tailed)
Sum of BEFORE FOCUS PES visits	Yes	1.55	1.63	88	T=-0.474 Df=49.7 P=0.272
	No	1.76	2.63	38	
Sum of AFTER FOCUS PES visits	Yes	1.31	1.65	88	T=-1.122 Df=50.6 P=0.196
	No	1.82	2.58	38	

TABLE VI; Independent variables examined in relation to the dependent variable "# of PES visits after date of admission to FOCUS":

Variable		Mean # PES visits	Standard deviation	N=126	Test statistic Independent samples t-test for equality of means Equal variances not assumed Significance (2 tailed)
Gender	Male	1.26	1.54	80	T=1.31 Df=64.2 P=0.195
	Female	1.80	2.55	46	
Race	White	0.9	1.36	15	T=1.736 Df=24.1 P=0.095
	black	1.6	2.06	108	
Co-occurring Personality disorder	yes	1.96	2.47	79	T= -1.98 Df=68.3 P<0.052
	no	1.16	1.56	47	
Co-occurring Substance use disorder	yes	1.49	1.89	96	T=0.269 Df=42.4 P=0.789
	no	1.37	2.27	30	
Co-occurring Medical disorder	yes	1.38	2.10	52	T= -0.353 Df=103.0 P=0.725
	no	1.51	1.90	74	

NUMBER OF PSYCHIATRIC INPATIENT ADMISSIONS

TABLE VII; Pre and post (paired t-test) all subject results

Variable	**Mean # inpatient admissions**	**Standard deviation**	**N**	**Test statistic One sample t-test Significance (2 tailed)**
Number of before FOCUS psychiatric inpatient admissions	**1.38**	0.81	105	**T=17.4 Df=104 p<0.001***
Number of after FOCUS psychiatric inpatient admissions	**0.43**	0.90	105	

***statistically significant difference**

TABLE VIII; FOCUS completers vs. non-completers:

Variable	**Completed FOCUS?**	**Mean # inpatient admissions**	**Standard deviation**	**N**	**Test statistic Independent samples t-test for equality of means Equal variances not assumed Significance (2 tailed)**
Number of BEFORE FOCUS inpatient admissions	Yes	1.38	0.84	77	T=0.096 Df=54.4 P=0.868
	No	1.39	0.74	28	
Number of AFTER FOCUS inpatient admissions	Yes	0.42	0.89	77	T=0.241 Df=46.7 P=0.735
	No	0.46	0.92	28	

NUMBER OF PSYCHIATRIC INPATIENT ADMISSIONS (CONT'D)

TABLE IX; Independent variables examined in relation to the dependent variable "# of psychiatric inpatient admissions after date of admission to FOCUS":

Variable		**Mean # inpatient admissions**	**Standard deviation**	**N=105**	**Test statistic Independent samples t-test for equality of means Equal variances not assumed Significant difference? (2 tailed)**
Gender	Male	0.48	0.725	65	T=0.374
	Female	0.40	1.132	40	Df=58.9
					P=0.709
Race	White	0.64	1.12	11	T= -0.615
	black	0.42	0.89	88	Df=11.6
					P=0.55
Co-occurring Personality disorder	yes	**0.48**	0.94	92	T= -3.22
	no	**0.08**	0.28	13	Df=61.6
					P<0.002*
Co-occurring Substance use disorder	yes	0.43	0.91	74	T= -0.068
	no	0.42	0.89	31	Df=57.6
					P=0.946
Co-occurring Medical disorder	yes	0.56	0.91	36	T= -1.04
	no	0.36	0.89	69	Df=69.9
					P=0.301

***statistically significant difference**

NUMBER OF PSYCHIATRIC INPATIENT DAYS

TABLE X; Pre and post (paired t-test) all subject results

Variable	**Mean # inpatient days**	**Standard deviation**	**N=105**	**Paired samples t-test Significance (2 tailed)**
Sum of before FOCUS inpatient days per subject	**18.95**	13.3	105	**T= 7.57 Df=104 (p<0.001)***
Sum of after FOCUS inpatient days per subject	**5.11**	12.0	105	

TABLE XI; FOCUS completers vs. non-completers:

Variable	**Completed FOCUS?**	**Mean # inpatient days**	**Standard deviation**	**N**	**Test statistic Independent samples t-test for equality of means Equal variances not assumed Significance (2 tailed)**
Sum of: BEFORE FOCUS psychiatric inpatient days	Yes	18.0	12.28	77	T=1.108 Df=39.8 (p=0.275)
	No	21.6	15.63	28	
Sum of : AFTER FOCUS psychiatric inpatient days	Yes	5.48	13.06	77	T= -0.633 Df=75.2 (p=0.529)
	No	4.11	8.36	28	

NUMBER OF PSYCHIATRIC INPATIENT DAYS (CONT'D)

TABLE XII; Independent variables examined in relation to the dependent variable "# of psychiatric inpatient days after date of admission to FOCUS":

Variable		Mean # inpatient days	Standard deviation	N=105	**Test statistic Independent samples t-test for equality of means Equal variances not assumed Significance (2 tailed)**
Gender	Male	6.29	13.63	65	t= -1.438 Df=103 (p=0.153)
	Female	3.20	8.40	40	
Race	white	10.64	24.0	11	T= -0.827 Df=10.4 (p=0.427)
	black	4.59	9.90	88	
Co-occurring Personality disorder	yes	**5.82**	12.63	92	**T= -4.27 Df=98.4 (p<0.001)***
	no	**0.15**	0.56	13	
Co-occurring Substance use disorder	yes	5.11	10.28	74	T= -0.007 Df=41.6 (p=0.995)
	no	5.13	15.45	31	
Co-occurring Medical disorder	yes	8.11	16.6	36	T=1.55 Df=44.4 (p=0.129)
	No	3.55	8.35	69	

NUMBER OF NON URGENT PSYCHIATRIC VISITS

TABLE XIII; Pre and post (paired t-test) all subject results)

Variable	**Mean # non-urgent psychiatric visits**	**Standard deviation**	**N=177**	**Paired samples t-test Significance (2 tailed)**
Number non-urgent psychiatric visits of before the FOCUS admit date	**3.9**	8.617	177	**T= -6.983 Df=176 p<0.001***
Number of non-urgent psychiatric visits after the FOCUS discharge date	**11.7**	14.053	177	

TABLE XIV; Focus completers vs. non-completers

Variable	**Completed FOCUS?**	**Mean # non-urgent psychiatric visits**	**Standard deviation**	**N=177**	**Test statistic Independent samples t-test for equality of means Equal variances not assumed Significance (2 tailed)**
Number non-urgent psychiatric visits of before the FOCUS admit date	Yes	4.4	9.2	125	T= =125 Df=1.245 P=0.216
	No	2.8	7.0	52	
#non-urgent psychiatric visits after the FOCUS discharge date	Yes	**14.4**	14.9	125	**T= -5.1 Df= 153.5 P<0.001***
	No	**5.1**	8.9	52	

NUMBER OF NON URGENT PSYCHIATRIC VISITS (CONT'D)

TABLE XV; Independent variables examined in relation to the dependent variable "# of non-urgent psychiatric visits after the date of discharge from FOCUS":

Variable		**Mean # non-urgent psychiatric visits**	**Standard deviation**	**N=177**	**Test statistic Independent samples t-test for equality of means Equal variances not assumed Significance (2 tailed)**
Gender	Male	11.68	15.30	110	T=0.005 Df=165.1 (p=0.996)
	Female	11.67	11.83	67	
Race	White	11.07	18.78	28	T= -0.175 Df=32.4 (p=0.862)
	black	11.72	13.2	143	
Co-occurring Personality disorder	yes	11.55	13.9	154	T= -0.306 Df=27.9 (p=0.762)
	no	12.57	15.1	23	
Co-occurring Substance use disorder	yes	11.17	13.8	130	T=-0.775 Df=76.9 (p=0.441)
	no	13.09	14.78	47	
Co-occurring Medical disorder	yes	13.13	15.8	71	T=1.08 Df=127.9 (p=0.284)
	no	10.71	12.7	106	